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Flux-density variability of the blazar S5 1803+784 (J1800+7828) on a timescale of a month

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Abstract

The variability of the blazar S5 1803+784 (J1800+7828) on a timescale of a month is analyzed using daily RATAN-600 observations in 2009 (a total of 154 observations) at five frequences from 2.3 to 21.7 GHz. Cyclic variability of the flux density was detected at 7.7, 11.1, and 21.7 GHz on a timescale of 34-35 days, with modulation indices of 2.1, 3.6, and 6.6%, respectively. Characteristic time scales are derived from the light curves and the structure and autocorrelation functions. The spectrum of the variable component is rising, with spectral index $\alpha \approx 1.3$. The delays of the light-curve maxima between 21.7-11.1 and 11.1-7.7 GHz are three to four days. The integrated spectra for different light-curve phases indicate that the maximum shifts toward lower frequencies as the flux density passes through the maximum. Our results suggest that the variability can be explained mainly by non-stationary processes in the radio source itself, due to the propagation of shocks in the jet.

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